

Application Based on

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**PHOTOGRAPHIC PROCESSING SYSTEM HAVING A VACUUM  
PLATEN**

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## **PHOTOGRAPHIC PROCESSING SYSTEM**

### **HAVING A VACUUM PLATEN**

#### **FIELD OF THE INVENTION**

The present invention relates to a photographic processing system  
5 in which a vacuum platen is adapted to convey and hold photographic media  
during the processing of the media.

#### **BACKGROUND OF THE INVENTION**

Conventional photographic systems for processing photographic  
media generally process the media in processing tanks, wherein the media is  
10 conveyed through the tanks so as to be in contact with several distinct processing  
solutions. The conveyance of the media essentially utilizes conveying rollers  
which in most instances touch both the emulsion and non-emulsion side of the  
photographic media. Further, the utilization of conveying rollers in most  
instances does not assure that the photographic media is held flat during the  
15 processing cycle. These factors adversely affect the subsequent processing of the  
photographic media.

#### **SUMMARY OF THE INVENTION**

The present invention provides for a photographic processing  
system and a method of processing photographic media which utilizes a vacuum  
20 platen that is adapted to hold photographic media (such as a sheet) flat during  
processing, and is further adapted to transport the sheet without touching the  
emulsion side of the photographic media. The system of the present invention  
further permits photographic chemicals or solutions to be sprayed or applied onto  
the photographic media at the same time that vacuum pressure for holding the  
25 sheet flat is applied, without allowing these photographic chemicals to enter or get  
into a vacuum pump.

The present invention therefore relates to a photographic  
processing system that comprises a conveying member adapted to transport  
photographic media to be processed, with the conveying member comprising a  
30 plurality of slots, and the conveying member being provided on top of a vacuum  
chamber; a processing solution supply member adapted to supply processing  
solution onto photographic media on the conveying member to process the

photographic media; and a vacuum air source adapted to apply a vacuum suction force to the vacuum chamber. The suction force passes through slots on the conveying member to hold photographic media on the conveying member flat.

5 The present invention further relates to a method of processing photographic media which comprises the steps of placing exposed photographic media on a surface of a conveying member, with the surface of the conveying member having a plurality of slots therein; applying a vacuum suction force through the slots to hold the photographic media flat on the surface of the conveying member; and supplying a processing solution onto the photographic  
10 media while the photographic media is being held on the conveying member by the suction force.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

Fig. 1 is a view of a processing system including a vacuum platen in accordance with the present invention;

15 Fig. 2 is a further view of the processing system of Fig. 1;

Fig. 3 is a view of a vacuum chamber and suction air path of the processing system of the present invention; and

Fig. 4 is a view of a further embodiment of the processing system.

#### **DETAILED DESCRIPTION OF THE INVENTION**

20 Referring now to the drawings, wherein like reference numerals designate identical or corresponding parts throughout the several views, Fig. 1 is a schematic illustration of a photographic processing system 5 in accordance with the present invention. Photographic processing system 5 preferably makes up part of an overall photographic processing arrangement wherein a suitable transporting  
25 arrangement transports exposed photographic media in a direction represented by arrow 7 towards a conveying member 9. Conveying member 9 preferably comprises an endless belt 11 having a plurality of slots, holes or apertures 14 therein. Endless belt 11 is wrapped around rollers 15 and 15' as shown in Fig. 2.

Processing system 5 further includes a processing solution supply  
30 member 17 which has a plurality of discharge openings that face down onto a top surface 18 of belt 11. Processing solution supply member 17 preferably receives processing solution from a known solution supply source and is adapted to

discharge or spray the processing solution onto photographic media on surface 18 of conveying belt 11, to permit a processing (such as an impingement processing) of the photographic media. Processing solutions utilized and supplied by solution supply member 17 are the solutions known in photographic processing to develop  
5 exposed images on photographic media, such as developer solution, bleach solution, fixed solution, etc.; or supply member 17 could be an ink cartridge adapted to apply a processing solution such as ink onto the media.

Therefore, in order to process and expose photographic media (preferably a photographic sheet) in accordance with the present invention, the  
10 sheet is supplied in the direction of arrow 7 onto processing system 5. The sheet is directed onto top surface 18 of endless belt 11 and passes between the discharge opening of processing solution supply member 17 and surface 18 of belt 11. As the sheet passes between processing solution supply member 17 and top surface 18, processing solution is sprayed and/or supplied onto the top surface of the  
15 photographic sheet to process or develop the exposed images on the sheet.

In a feature of the present invention, belt 11 of conveying member 9 includes slots 14 as described above. Therefore, as the solution is sprayed onto the photographic sheet, excess solution which drips off the sheet will fall through slots 14 into a vacuum chamber 20 located below top surface 18 of belt 11. The  
20 interior of chamber 20 is illustrated in Fig. 3. Chamber 20 is preferably designed to receive all excess solution which drips through slots 14 and appropriately drain the solution through a discharge line 22 to an appropriate drain site or to a site to be recycled.

In a further feature of the present invention, during processing of  
25 the photographic sheet, it is preferable that the photographic sheet be held in a flat state. With the arrangement of the present invention, a vacuum source in the form of, for example, a vacuum pump 24 is adapted to apply a suction force through a suction path 26 as shown in Figs. 1-3. This arrangement provides the advantage of transporting photographic sheets emulsion side up in a manner in which the  
30 emulsion side is not contacted and the non-emulsion side contacts the top surface 18 of belt 11. Further, the sheet is held flat during processing by the suction force applied by vacuum pump 24 through chamber 26 and slots 14. Thus, the suction

force can be applied while the solution is being supplied to the media or after the solution is supplied to the media.

With the arrangement of the present invention, photographic processing solution supplied from supply member 17 will leak down through slots 14 into chamber 20. This raises the possibility of the solution entering suction path 26 and vacuum pump 24 which could adversely affect the operation of pump 24. This is prevented by a further feature of the invention which includes a wall 30 and a baffle 32 as shown in Fig. 3. Wall 30 generally divides vacuum chamber 20 into a first section 20a which is essentially located below belt 11, and a second section 20b which is closer to vacuum pump 24 than first section 20a. Baffle 32 is located generally above wall 30 and mounted on a wall of chamber 20. The combination of wall 30 and baffle 32 serves the dual purpose of (1) permitting the application of suction force from vacuum pump 24 and path 26 through slots 14 to hold photographic sheets flat during processing; and (2) preventing any processing solution which falls into first part 20a of vacuum chamber 20 from reaching path 26 and vacuum pump 24. Thus, with the arrangement of the present invention, the path of the suction air force is generally described by reference 40, and as shown, the suction force travels over the top surface of wall 30, between baffle 32 and wall 30, and extends between vacuum pump 24 and chamber 20a, to apply a suction force through slots 14 of belt 11.

Therefore, the combination of wall 30 and baffle 32 prevent processing solution from splashing throughout the processing system, maintains the solution within chamber 20a for drainage to drain 22, and prevents solution from reaching suction path 26 and contacting vacuum pump 24. That is, as shown in Fig. 3, baffle 32 preferably includes a generally flat or horizontal section 32a that extends above a top surface of wall 30 and an inclined section 32b which is inclined in a direction towards first part 20a of vacuum chamber 20. This provides for the guidance of the suction force from vacuum pump 40 and in addition, helps maintain the processing solution within the confines of part 20a of chamber 20.

As shown in Fig. 1, the processing solution can be applied in a vicinity of the entrance of processing system 5 such that the conveyance of the

sheet from this point provides a dwell time that is sufficient to allow development of the image(s) on the sheet. As a further option, the processing solution can be supplied from an area in the vicinity of the center of conveying member 9 as shown in Fig. 4 by locating solution supply member 17 in the vicinity of the center of conveying member 9. In this situation, conveying member 9 can be extended downstream from supply member 17 to allow for a longer dwell time, or the length can remain unchanged from the previous embodiment with the sheet being held in one spot until the appropriate amount of development time has occurred.

10                   The invention has been described in detail with particular reference to certain preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.